

(2) shade, increasing permanency; (3) wind, tending to decrease duration; (4) moisture, tending to lengthen duration; and (5) bog habitat, causing the same early fall as dry habitat. In general, factors which cause increase in transpiration are accompanied by decrease in leaf duration, while those factors tending toward decrease in photosynthetic activity are accompanied by increased duration. The author of the paper is to be commended upon its good organization.—GEO. D. FULLER.

Physical factors in plant distribution.—The recent advances along the line of devoting more attention to the factors controlling vegetation and the progress made in more correctly evaluating these factors have been discussed by SHREVE,¹⁵ who has also pointed out the striking contrasts in the physical conditions of mountains in humid and arid regions.¹⁶ The contrasts in humidity are most marked, but are manifest also in temperature and light. Examples are seen in the Blue Mountains of Jamaica, with a daily temperature range of 6–10°, compared with the Santa Catalina Mountains of Arizona, with a daily range of 40–65° and corresponding annual amplitudes. These and other differences enumerated result in plant associations where a stratified rain forest in the former region, with large trees, under trees, shrubs, large herbs, and small hygrophilous plants superimposed in luxuriant profusion, contrasts with the scanty shrubs, the open pine forests, and somewhat denser fir forests, all almost devoid of any stratification whatever, which are distributed over the slopes of the latter.—GEO. D. FULLER.

Anatomy of Betulaceae.—The intensive anatomical work among the gymnosperms has forged an unusually effective weapon for attacking phylogeny, and it is beginning to be used in the interpretation of angiosperms, with very interesting results. HOAR¹⁷ has investigated the anatomy of the Betulaceae and has come to the conclusion that the group belongs “near the base of the dicotyledons,” and that *Alnus* most clearly illustrates the primitive conditions. In this genus the aggregate condition of rays is either normally developed or in a state of reduction, while in the more advanced genera (*Carpinus*, *Ostrya*, and *Betula*) the aggregate condition persists only in conservative regions or is “recalled by injuries.” The conclusion of course depends upon the position of the aggregate ray in the phylogenetic series of ray structures. In the same connection *Casuarina* was investigated, the result being to confirm its low position among the dicotyledons, and also its close anatomical relation-

¹⁵ SHREVE, FORREST, The weight of physical factors in the study of plant distribution. *Plant World* 19:53–67. 1916.

¹⁶ ———, The physical control of vegetation in rain forest and desert mountains. *Plant World* 20:135–141. 1917.

¹⁷ HOAR, CARL S., The anatomy and phylogenetic position of the Betulaceae. *Amer. Jour. Bot.* 3:415–435. pls. 16–19. 1916.